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SEQUENCE LISTING

<110> Dimitrov, Dimiter Stanchev
Chow, Yen-Hung
Phogat, Sanjay Kumar
Broder, Christopher Charles
The Government of the United States of America
as represented by The Secretary of the
Department of Health and Human Services

<120> HIV-1 Envelope Glycoproteins Stabilized by Flexible
Linkers as Potent Entry Inhibitors and Immunogens

<130> 015280-458000US

<140> US 10/506,651

<141> 2004-09-02

<150> WO PCT/US02/07144

<151> 2002-03-05

<160> 33

<170> PatentIn Ver. 2.1

<210> 1

<211> 2562

<212> DNA

<213> Human immunodeficiency virus type 1

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<223> full length human immunodeficiency virus-1 (HIV-1)
envelope glycoprotein (Env, gp160) from primary
R5X4 isolate 89.6

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gagactgaga	tcttcagacc	tgaggaggga	gatatgaggg	acaattggag	aagtgaatta	1440
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<211> 853

<212> PRT

<213> Human immunodeficiency virus type 1

<220>

<223> full length human immunodeficiency virus-1 (HIV-1)
envelope glycoprotein (Env, gp160) from primary
R5X4 isolate 89.6

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His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro
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 Lys Val Ser Phe Gln Pro Ile Pro Ile His Tyr Cys Val Pro Ala Gly
 210 215 220
 Phe Ala Met Leu Lys Cys Asn Asn Lys Thr Phe Asn Gly Ser Gly Pro
 225 230 235 240
 Cys Thr Asn Val Ser Thr Val Gln Cys Thr His Gly Ile Arg Pro Val
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 Val Ile Arg Ser Glu Asn Phe Thr Asp Asn Ala Lys Thr Ile Ile Val
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Ile Ala Val Ala Glu Gly Thr Asp Arg Val Ile Lys Ile Val Gln Arg
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Glu Arg Ala Leu Leu
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<210> 3
<211> 2051
<212> DNA
<213> Human immunodeficiency virus type 1

<220>
<223> human immunodeficiency virus-1 (HIV-1) envelope
glycoprotein gp140 truncated version of gp 160
from primary R5X4 isolate 89.6

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 <213> Human immunodeficiency virus type 1

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 <223> human immunodeficiency virus-1 (HIV-1) envelope
 glycoprotein gp140 truncated version of gp 160
 from primary R5X4 isolate 89.6

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 His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro
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 Gln Glu Val Val Leu Gly Asn Val Thr Glu Asn Phe Asn Met Trp Lys
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 Glu Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu
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 Tyr Arg Leu Ile Ser Cys Asn Thr Ser Val Ile Thr Gln Ala Cys Pro
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 Cys Thr Asn Val Ser Thr Val Gln Cys Thr His Gly Ile Arg Pro Val
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 260 265 270

Val Ile Arg Ser Glu Asn Phe Thr Asp Asn Ala Lys Thr Ile Ile Val
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 355 360 365
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 385 390 395 400
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 405 410 415
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 His Met Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg
 565 570 575
 Val Leu Ala Leu Glu Arg Tyr Leu Arg Asp Gln Gln Leu Met Gly Ile
 580 585 590

Trp Gly Cys Ser Gly Lys Leu Ile Cys Thr Thr Ser Val Pro Trp Asn
595 600 605

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610 615 620

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<211> 27

<212> DNA

<213> Artificial Sequence

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<223> Description of Artificial Sequence:cleavage site
and start of gp41 in gp160 (env 89.6)

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<210> 6

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<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:cleavage site
and start of gp41 in gp160 (env 89.6)

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Arg Glu Lys Arg Ala Val Gly Ile
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<210> 7

<211> 667

<212> PRT

<213> Artificial Sequence

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<223> Description of Artificial Sequence:gp140-26
(soluble, secreted protein)

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Thr Glu Val His Asn Gly Trp Ala Thr His Ala Cys Val Ala Thr Asp
35 40 45

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Val	Thr	Leu	Asn	Cys	Thr	Asn	Leu	Asn	Ile	Thr	Lys	Asn	Thr	Thr	Asn	
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 580 585 590
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 Ser Asn Lys Ser Val Asp Asp Ile Trp Asn Asn Met Thr Trp Met Glu
 610 615 620
 Leu Glu Arg Glu Ile Asp Asn Tyr Thr Asp Tyr Ile Tyr Asp Leu Leu
 625 630 635 640
 Glu Lys Ser Gln Thr Gln Gln Glu Lys Asn Glu Lys Glu Leu Leu Glu
 645 650 655
 Leu Asp Lys Trp Ala Ser Leu Trp Lys Leu Val
 660 665

<210> 8
 <211> 656
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence:gp140-15
 (soluble, secreted protein)

<400> 8
 Lys Glu Lys Thr Trp Val Thr Ile Tyr Tyr Gly Val Pro Val Trp Arg
 1 5 10 15
 Glu Ala Thr Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Asp
 20 25 30
 Thr Glu Val His Asn Gly Trp Ala Thr His Ala Cys Val Ala Thr Asp
 35 40 45
 Pro Asn Pro Gln Glu Val Val Leu Gly Asn Val Thr Glu Asn Phe Asn
 50 55 60
 Met Trp Lys Asn Asn Met Val Asp Gln Met His Glu Asp Ile Ile Ser
 65 70 75 80
 Leu Leu Asp Glu Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys
 85 90 95
 Val Thr Leu Asn Cys Thr Asn Leu Asn Ile Thr Lys Asn Thr Thr Asn
 100 105 110
 Pro Thr Ser Ser Ser Leu Gly Met Met Glu Lys Gly Glu Ile Lys Asn
 115 120 125
 Cys Ser Phe Tyr Ile Thr Thr Ser Ile Arg Asn Lys Val Lys Lys Glu
 130 135 140
 Tyr Ala Leu Phe Asn Arg Leu Asp Val Val Pro Ile Glu Asn Thr Asn
 145 150 155 160
 Asn Thr Lys Tyr Arg Leu Ile Ser Cys Asn Thr Ser Val Ile Thr Gln
 165 170 175
 Ala Cys Pro Lys Val Phe Phe Gln Pro Ile Ala Ile His Tyr Cys Val
 180 185 190
 Pro Ala Gly Phe Ala Met Leu Lys Cys Asn Asn Lys Thr Phe Asn Gly
 195 200 205
 Ser Gly Pro Cys Thr Asn Val Ser Thr Val Pro Cys Thr His Gly Ile
 210 215 220
 Arg Pro Val Val Ser Thr Gln Leu Leu Leu Asn Gly Ser Leu Ala Glu
 225 230 235 240
 Glu Asp Ile Val Ile Arg Ser Gly Asn Phe Thr Asp Asn Ala Lys Thr
 245 250 255
 Ile Ile Val Gln Leu Asn Glu Ser Val Val Ile Asn Cys Thr Arg Pro
 260 265 270

Asn	Asn	Asn	Thr	Arg	Arg	Arg	Leu	Ser	Ile	Gly	Pro	Gly	Arg	Ala	Phe		
		275					280					285					
Tyr	Ala	Arg	Arg	Asn	Ile	Ile	Gly	Asp	Ile	Arg	Gln	Ala	His	Cys	Asn		
	290					295					300						
Ile	Ser	Arg	Ala	Lys	Leu	Asn	Asn	Thr	Leu	Gln	Gln	Ile	Val	Ile	Lys		
305					310					315					320		
Leu	Arg	Glu	Lys	Phe	Arg	Asn	Lys	Thr	Ile	Ala	Phe	Asn	Gln	Ser	Ser		
				325					330					335			
Gly	Gly	Asp	Pro	Glu	Ile	Val	Met	His	Ser	Phe	Asn	Cys	Gly	Gly	Glu		
			340					345					350				
Phe	Phe	Tyr	Cys	Asn	Thr	Ala	Gln	Leu	Phe	Asn	Ser	Thr	Leu	Asn	Val		
		355					360						365				
Thr	Gly	Gly	Thr	Asn	Gly	Thr	Glu	Glu	Asn	Asp	Ile	Ile	Thr	Leu	Gln		
	370					375					380						
Cys	Arg	Ile	Lys	Gln	Ile	Ile	Asn	Met	Trp	Gln	Lys	Val	Gly	Lys	Ala		
385					390					395					400		
Met	Tyr	Ala	Pro	Pro	Ile	Thr	Gly	Gln	Ile	Ile	Cys	Ser	Ser	Asn	Ile		
				405					410					415			
Thr	Gly	Leu	Leu	Leu	Thr	Arg	Asp	Gly	Gly	Asn	Ser	Thr	Glu	Thr	Glu		
			420					425					430				
Thr	Glu	Ile	Phe	Arg	Pro	Gly	Gly	Gly	Asp	Met	Arg	Asp	Asn	Trp	Arg		
	435					440						445					
Ser	Glu	Leu	Tyr	Lys	Tyr	Lys	Val	Val	Arg	Ile	Glu	Pro	Ile	Gly	Val		
	450					455					460						
Ala	Pro	Thr	Arg	Ala	Lys	Arg	Arg	Thr	Cys	Gln	Gly	Gly	Ile	Asp	Gly		
465					470					475					480		
Ile	Leu	Gln	Ile	Ser	Ser	Ser	Gly	Gly	Ala	Gly	Gly	Lys	Gly	Ala	Val		
				485					490					495			
Gly	Ile	Gly	Ala	Val	Phe	Leu	Gly	Phe	Leu	Gly	Ala	Ala	Gly	Ser	Thr		
			500					505					510				
Met	Gly	Ala	Arg	Ser	Val	Thr	Leu	Thr	Val	Gln	Ala	Arg	Leu	Leu	Leu		
		515					520					525					
Ser	Gly	Ile	Val	Gln	Gln	Gln	Asn	Asn	Leu	Leu	Arg	Ala	Ile	Glu	Ala		
	530					535					540						
Gln	Gln	His	Met	Leu	Gln	Leu	Thr	Val	Trp	Gly	Ile	Lys	Gln	Leu	Gln		
545					550					555					560		
Ala	Arg	Val	Leu	Ala	Leu	Glu	Arg	Tyr	Leu	Arg	Asp	Gln	Gln	Leu	Met		
				565					570					575			
Gly	Ile	Trp	Gly	Cys	Ser	Gly	Lys	Leu	Ile	Cys	Thr	Thr	Ser	Val	Pro		
			580					585					590				

Trp Asn Val Ser Trp Ser Asn Lys Ser Val Asp Asp Ile Trp Asn Asn
595 600 605

Met Thr Trp Met Glu Leu Glu Arg Glu Ile Asp Asn Tyr Thr Asp Tyr
610 615 620

Ile Tyr Asp Leu Leu Glu Lys Ser Gln Thr Gln Gln Glu Lys Asn Glu
625 630 635 640

Lys Glu Leu Leu Glu Leu Asp Lys Trp Ala Ser Leu Trp Lys Leu Val
645 650 655

<210> 9
<211> 4
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:peptide linker

<400> 9
Gly Ile Leu Ile
1

<210> 10
<211> 15
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:preferred
peptide linker

<400> 10
Gly Gly Ile Asp Gly Ile Leu Gln Ile Ser Ser Ser Gly Gly Ala
1 5 10 15

<210> 11
<211> 26
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:preferred
peptide linker

<400> 11
Gly Gly Ile Asp Gly Ile Leu Gln Ile Ser Gly Ser Gly Ser Gly Gly
1 5 10 15

Ser Gly Gln Gly Ser Ser Ser Gly Gly Ala
20 25

<210> 12
<211> 15
<212> PRT
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:preferred
peptide linker

<400> 12

Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly
1 5 10 15

<210> 13

<211> 20

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:preferred
peptide linker

<400> 13

Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly
1 5 10 15

Gly Ser Gly Gly
20

<210> 14

<211> 25

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:preferred
peptide linker

<400> 14

Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly
1 5 10 15

Gly Ser Gly Gly Gly Gly Ser Gly Gly
20 25

<210> 15

<211> 24

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:exemplary
linker

<220>

<221> MOD_RES

<222> (7)..(24)

<223> amino acids at positions 7-8, 9-10, 11-12, 13-14,
15-16, 17-18, 19-20, 21-22, and 23-24 may be
present or absent

<400> 15
Gly Ser Gly Ser Gly Ser Gly Ser Gly Ser Gly Ser Gly Ser
1 5 10 15

Gly Ser Gly Ser Gly Ser Gly Ser
20

<210> 16
<211> 48
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:exemplary
linker

<220>
<221> MOD_RES
<222> (13)..(48)
<223> amino acids at positions 13-16, 17-21, 22-24,
25-28, 29-32, 33-36, 37-40, 41-44, and 45-48 may
be present or absent

<400> 16
Gly Gly Gly Ser Gly Gly Gly Ser Gly Gly Gly Ser Gly Gly Gly Ser
1 5 10 15
Gly Gly Gly Ser Gly Gly Gly Ser Gly Gly Gly Ser Gly Gly Gly Ser
20 25 30
Gly Gly Gly Ser Gly Gly Gly Ser Gly Gly Gly Ser Gly Gly Gly Ser
35 40 45

<210> 17
<211> 60
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:exemplary
linker

<220>
<221> MOD_RES
<222> (16)..(60)
<223> amino acids at positions 16-20, 21-25, 26-30,
31-35, 36-40, 41-45, 46-50, 51-55 and 55-60 may be
present or absent

<400> 17
Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly
1 5 10 15
Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly
20 25 30

Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly
35 40 45

Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser
50 55 60

<210> 18
<211> 72
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:exemplary
linker

<220>
<221> MOD_RES
<222> (19)..(72)
<223> amino acids at positions 19-24, 25-30, 31-36,
37-42, 43-48, 49-54, 55-60, 61-66 and 67-72 may be
present or absent

<400> 18
Gly Gly Gly Gly Gly Ser Gly Gly Gly Gly Gly Ser Gly Gly Gly Gly
1 5 10 15
Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly
20 25 30
Gly Gly Gly Ser Gly Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser
35 40 45
Gly Gly Gly Gly Gly Ser Gly Gly Gly Gly Gly Ser Gly Gly Gly Gly
50 55 60
Gly Ser Gly Gly Gly Gly Ser
65 70

<210> 19
<211> 12
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:exemplary
linker

<400> 19
Gly Gly Gly Ser Gly Gly Gly Ser Gly Gly Gly Ser
1 5 10

<210> 20
<211> 20
<212> PRT
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:exemplary
linker

<400> 20

Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly
1 5 10 15

Gly Gly Gly Ser
20

<210> 21

<211> 30

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:exemplary
linker

<400> 21

Gly Gly Gly Gly Gly Ser Gly Gly Gly Gly Gly Ser Gly Gly Gly Gly
1 5 10 15

Gly Ser Gly Gly Gly Gly Gly Ser Gly Gly Gly Gly Gly Ser
20 25 30

<210> 22

<211> 42

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:exemplary
linker

<400> 22

Gly Gly Gly Gly Gly Gly Ser Gly Gly Gly Gly Gly Gly Ser Gly Gly
1 5 10 15

Gly Gly Gly Gly Ser Gly Gly Gly Gly Gly Gly Ser Gly Gly Gly Gly
20 25 30

Gly Gly Ser Gly Gly Gly Gly Gly Ser
35 40

<210> 23

<211> 56

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:exemplary
linker

<400> 23

Gly Gly Gly Gly Gly Gly Gly Ser Gly Gly Gly Gly Gly Gly Ser
1 5 10 15

Gly Gly Gly Gly Gly Gly Gly Gly Ser Gly Gly Gly Gly Gly Gly Gly Ser
20 25 30

Gly Gly Gly Gly Gly Gly Gly Ser Gly Gly Gly Gly Gly Gly Gly Ser
35 40 45

Gly Gly Gly Gly Gly Gly Gly Ser
50 55

<210> 24

<211> 72

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:exemplary
linker

<400> 24

Gly Gly Gly Gly Gly Gly Gly Gly Ser Gly Gly Gly Gly Gly Gly Gly
1 5 10 15

Gly Ser Gly Gly Gly Gly Gly Gly Gly Gly Ser Gly Gly Gly Gly Gly
20 25 30

Gly Gly Gly Ser Gly Gly Gly Gly Gly Gly Gly Gly Ser Gly Gly Gly
35 40 45

Gly Gly Gly Gly Gly Ser Gly Gly Gly Gly Gly Gly Gly Ser Gly
50 55 60

Gly Gly Gly Gly Gly Gly Gly Ser
65 70

<210> 25

<211> 90

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:exemplary
linker

<400> 25

Gly Gly Gly Gly Gly Gly Gly Gly Ser Gly Gly Gly Gly Gly Gly
1 5 10 15

Gly Gly Gly Ser Gly Gly Gly Gly Gly Gly Gly Gly Ser Gly Gly
20 25 30

Gly Gly Gly Gly Gly Gly Gly Ser Gly Gly Gly Gly Gly Gly Gly
35 40 45

Gly Ser Gly Gly Gly Gly Gly Gly Gly Gly Ser Gly Gly Gly Gly
50 55 60

Gly Gly Gly Gly Gly Ser Gly Gly Gly Gly Gly Gly Gly Gly Gly Ser
65 70 75 80

Gly Gly Gly Gly Gly Gly Gly Gly Gly Ser
85 90

<210> 26

<211> 110

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:exemplary
linker

<400> 26

Gly Gly Gly Gly Gly Gly Gly Gly Gly Gly Gly Ser Gly Gly Gly Gly Gly
1 5 10 15

Gly Gly Gly Gly Gly Ser Gly Gly Gly Gly Gly Gly Gly Gly Gly Gly Gly
20 25 30

Ser Gly Gly Gly Gly Gly Gly Gly Gly Gly Gly Gly Ser Gly Gly Gly Gly
35 40 45

Gly Gly Gly Gly Gly Gly Ser Gly Gly Gly Gly Gly Gly Gly Gly Gly Gly
50 55 60

Gly Ser Gly Gly Gly Gly Gly Gly Gly Gly Gly Gly Gly Ser Gly Gly Gly
65 70 75 80

Gly Gly Gly Gly Gly Gly Gly Ser Gly Gly Gly Gly Gly Gly Gly Gly Gly
85 90 95

Gly Gly Ser Gly Gly Gly Gly Gly Gly Gly Gly Gly Gly Ser
100 105 110

<210> 27

<211> 132

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:exemplary
linker

<400> 27

Gly Gly Gly Gly Gly Gly Gly Gly Gly Gly Gly Ser Gly Gly Gly Gly
1 5 10 15

Gly Gly Gly Gly Gly Gly Gly Ser Gly Gly Gly Gly Gly Gly Gly Gly Gly
20 25 30

Gly Gly Gly Ser Gly Gly Gly Gly Gly Gly Gly Gly Gly Gly Ser
35 40 45

Gly Gly Gly Gly Gly Gly Gly Gly Gly Gly Gly Ser Gly Gly Gly Gly
50 55 60

Gly Gly Gly Gly Gly Gly Gly Ser Gly Gly Gly Gly Gly Gly Gly Gly
 65 70 75 80
 Gly Gly Gly Ser Gly Gly Gly Gly Gly Gly Gly Gly Gly Gly Ser
 85 90 95
 Gly Gly Gly Gly Gly Gly Gly Gly Gly Gly Ser Gly Gly Gly Gly
 100 105 110
 Gly Gly Gly Gly Gly Gly Gly Ser Gly Gly Gly Gly Gly Gly Gly Gly
 115 120 125
 Gly Gly Gly Ser
 130

<210> 28
 <211> 156
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence:exemplary
 linker

<400> 28
 Gly Gly Gly Gly Gly Gly Gly Gly Gly Gly Gly Gly Gly Gly Ser Gly Gly Gly
 1 5 10 15
 Gly Gly Gly Gly Gly Gly Gly Gly Gly Gly Ser Gly Gly Gly Gly Gly Gly
 20 25 30
 Gly Gly Gly Gly Gly Gly Ser Gly Gly Gly Gly Gly Gly Gly Gly Gly
 35 40 45
 Gly Gly Gly Ser Gly Gly Gly Gly Gly Gly Gly Gly Gly Gly Gly Gly
 50 55 60
 Ser Gly Gly Gly Gly Gly Gly Gly Gly Gly Gly Gly Gly Gly Ser Gly Gly
 65 70 75 80
 Gly Gly Gly Gly Gly Gly Gly Gly Gly Gly Gly Ser Gly Gly Gly Gly Gly
 85 90 95
 Gly Gly Gly Gly Gly Gly Gly Ser Gly Gly Gly Gly Gly Gly Gly Gly Gly
 100 105 110
 Gly Gly Gly Gly Ser Gly Gly Gly Gly Gly Gly Gly Gly Gly Gly Gly
 115 120 125
 Gly Ser Gly Gly Gly Gly Gly Gly Gly Gly Gly Gly Gly Gly Gly Ser Gly
 130 135 140
 Gly Gly Gly Gly Gly Gly Gly Gly Gly Gly Gly Gly Ser
 145 150 155

<210> 29
 <211> 36
 <212> PRT
 <213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:exemplary
linker

<220>
<221> MOD_RES
<222> (10)..(36)
<223> amino acids at positions 10-12, 13-15, 16-18,
19-21, 22-24, 25-27, 28-30, 31-33 and 34-36 may be
present or absent

<400> 29
Ala Gly Ser Ala Gly Ser Ala Gly Ser Ala Gly Ser Ala
1 5 10 15
Gly Ser Ala Gly Ser Ala Gly Ser Ala Gly Ser Ala Gly
20 25 30
Ser Ala Gly Ser
35

<210> 30
<211> 4
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:post
translational cleavage site

<400> 30
Arg Glu Lys Arg
1

<210> 31
<211> 4
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:mutated post
translational cleavage site

<400> 31
Arg Glu Ile Asp
1

<210> 32
<211> 4
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:short fragment
following mutated cleavage site created by
introduction of restriction sites

<400> 32
Glu Phe Ile Ser
1

<210> 33
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: polypeptide
linker end

<400> 33
Gly Gly Ser Gly Gly
1 5